SURVEY OF FURBEARERS IN FALL RIVER COUNTY SOUTH DAKOTA WITH EMPHASIS ON SWIFT FOX (*VULPES VELOX*)

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ABSTRACT

Suitable soil substrates in 2 survey areas of Fall River County, South Dakota containing both public (i.e., Buffalo Gap National Grassland) and private rangeland were searched for evidence of furbearers with emphasis on swift fox (*Vulpes velox*) between 1 September and 4 November 1999. Surveys of roads, dams, creeks, and cowpaths were conducted by walking selected land quarter sections (64.8 ha [160 acres]) and documenting sign (i.e., tracks, feces) of furbearers. A total of 430 quarter sections were searched. Identifiable evidence of furbearers was found in 253 quarter sections. Sixty-three percent of the evidence was found on the shores of stock dams. Striped skunks (*Mephitis mephitis*), coyotes (*Canis latrans*), and raccoon (*Procyon lotor*) were the most abundant furbearers. Evidence (tracks, den sites) of swift fox presence was found in 17 quarter sections in Survey Area 1 and at one potential location in Survey Area 2. Sixteen (94%) of the swift fox tracks/sign in Survey Area 1 occurred in quarter sections with no red fox (*Vulpes vulpes*) sign. Fifty-three percent of quarter sections with swift fox sign did not contain coyote sign. Eighty-five percent of quarter sections in Survey Area 2 contained coyote sign.

INTRODUCTION

Historically the swift fox ranged over much of the Great Plains. Although currently abundant in some portions of its range (e.g., Colorado, Kansas, and Wyoming), it is listed as a state threatened species in South Dakota (South Dakota Wildlife Diversity Homepage, http://www.state.sd.us/gfp/diversity/index.htm). Swift fox presence has recently been documented in Fall River (Kruse et al. 1995) and Shannon (Kruse et al. 1995, Dateo et al. 1996) counties in South Dakota. The purpose of this study was to determine relative abundance of furbearers and the general distribution of the swift fox population in Fall River County in 1999 using quarter-section track surveys of suitable soil substrates in areas of the county previously occupied by swift fox.

SURVEY AREAS

Surveys were conducted within 2 areas in Fall River County, South Dakota. Survey Area 1 was approximately 257 km^2 (100 mi^2 [397 quarter sections]) of south central Fall River County northeast of Ardmore, South Dakota. This survey area, consisting of both public and private rangeland, was selected because a swift fox population has been known to occur in the past and because recent results of bait station transects on the Buffalo Gap National Grassland indicated a decline in the population (L. Hetlet, USDA Forest Service, Hot Springs, SD, pers. commun.).

The final size of this area was determined by access to private land; 67% of landowners allowed access to their properties. Survey Area 2 consisted of 21 km^2 (8 mi^2 [33 quarter sections]) of the Buffalo Gap National Grassland northeast of Smithwick, South Dakota. It was selected because swift fox were previously documented at the site (Hetlet 1995).

Landscape features of both study areas consisted primarily of undulating to rolling topography with low to moderate slopes. Survey Area 1 had only a small area of shale outcrop and steep breaks on the north but Survey Area 2 had several areas of steeper topography along 3 canyons that bisected the area. All soils are derived from dark shales with scattered rock beds on ridgetops. High runoff from the rather impervious heavy clay, gumbo, soils has created steep sided gullies in many drainages. Some gullies in Survey Area 2 are extensive enough to be called canyons (i.e., Hay, Jim Wilson, and First Black canyons). Creeks are often dry except for intermittent pools. Primary creeks in Survey Area 1 are North and South Black Banks creeks and Medicine Creek all draining east to Horsehead Creek and Long Hollow Creek running west to Hat Creek. Many small earthen dams provide stock water and greatly diversify the wildlife habitat available in the area. Vegetation of most uplands is dominated by western wheatgrass (*Agropyron smithii*), green needlegrass *(Stipa viridula*), little bluestem (*Andropogon scoparius*), blue grama (*Bouteloua gracilis*), buffalo grass (*Buchloe dactyloides*), and various exotics, such as Japanese brome (*Bromus japonicus*) and sweet clover (*Melilotus officinalis*). In drainages, inland saltgrass (*Distichlis spicata*) and alkali sacaton (*Sporobolus airoides*) were common. Croplands are an insignificant portion of the surveyed area. Trees and shrubs are completely absent from all but the extreme western and northern portions of Survey Area 1, where some silver sagebrush (*Artemisia cana*) can be found, along with plum (*Prunus americana*), green ash (*Fraxinus pennsylvanica*) and cottonwood (*Populus deltoides*) trees in drainages. In Survey Area 2, woody plants, like snowberry (*Symphoricarpos occidentalis*) and a few cottonwoods occur only in portions of Hay, Jim Wilson, and First Black canyons. Scattered areas of yucca (*Yucca glauca*) and broom snakeweed (*Gutierrezia sarothrae*) occur on the uplands of both survey areas. Only one black-tailed prairie dog (*Cynomys ludovicianus*) town was found in Survey Area 1. The northern portion of Survey Area 2 contains several large black-tailed prairie dog towns.

Especially on public but also on much of the private rangeland, the height and density of the residual vegetation cover in fall 1999 was unprecedented (based on conversations with ranchers and Forest Service personnel). In recent years and in 1999 the area had precipitation much above normal with stock dams full to overflowing and many springs flowing all summer and into the fall. However, even with this above normal precipitation, Survey Area 1 was characterized (based on general observations) by low residual cover on private and state school lands in the northern portions of the area, possibly due to past grazing history. Survey Area 2 had qualitatively more moderate to high residual cover than Survey Area 1, with low residual cover restricted to prairie dog towns. The only significant precipitation during the survey period occurred at the beginning of the study, which restricted suitable substrates in many quarter sections to stock dams and pools remaining in creeks.

METHODS

Track/sign searches (Allen 1996) were conducted from 1 September to 4 November 1999. Features with predictable tracking surfaces (e.g., stock dams and drainages) were searched within each quarter section and other features (e.g., 2-track roads and cowpaths) were searched opportunistically to determine relative occurrence of furbearers. Sign on uplands (e.g., dens and other diggings and feces) was recorded as it was encountered if the evidence could be identified to species. Searches were conducted in both mornings and afternoons. Species sign in each quarter section and the type of feature where found were recorded. Canid tracks were measured and categorized by length according to S. Allen (North Dakota Game and Fish Department; unpubl. data, 1996) and Olson et al. (1997). Canid tracks 39 mm or less in length were identified as swift fox and tracks 40 - 42(mm) were placed in a swift fox/red fox (*Vulpes vulpes*) overlap category. When 2 or more tracks of an individual were present (i.e., front and hind paw prints), a range of size for each set of canid tracks was recorded. The average length of juvenile tracks was considered the low side of the range for the species. For swift fox, tracks of 32-36(mm) were considered juveniles. Unfortunately no width measurements of canid tracks were documented.

RESULTS AND DISCUSSION

Survey Area 1

A total of 397 quarter sections were searched (Table 1). Sign was found on uplands in 33 (19%) of these quarter sections; 173 (43%) of quarter sections contained no suitable track surfaces. No evidence of furbearers was found in 21 quarter sections where all suitable track surfaces were likely trampled by domestic cattle. In 235 quarter sections where recent evidence of furbearers was found, a total of 531 individuals was recorded; 139 skunk, 127 coyote, 101 raccoon, 53 muskrat (*Ondatra zibethicus*), 35 white-tailed jackrabbit (*Lepus townsendii*), 26 badger (*Taxidea taxus*), 19 red fox, 16 swift fox, 8 cottontail rabbit (*Sylvilagus* spp.), 4 mink (*Mustela vison*), 2 dog (*Canis familiaris*), and 1 swift/red fox. Recent evidence included tracks and other sign identifiable with reasonable certainty, such as feces of coyote, jackrabbits, and cottontail rabbits (*Sylvilagus floridanus*), and badger and skunk diggings (pits). Other evidence included 2 swift fox dens. These dens conformed to the normal swift fox den site (i.e., near hill top, several openings of about 20 cm diameter, flattened dirt fan), although both were well revegetated. One was occupied by Burrowing Owls (*Athene cunicularia*); the other had one hole recently cleaned out with a swift fox track at the edge in freshly dug dirt. Locations of 3 natal dens that had been active 4 or 5 years previous to this study (based on reports by landowners) and 3 dens reported by Hetlet (1995, 1996, 1998) on Buffalo Gap National Grassland also were visited. Evidence (furbearer sign) recorded by habitat feature included: 309 at dams, 109 along creeks, 33 from hardpan or overflow areas, 32 from upland range sites, 24 from cowpaths, 20 from 2-track roads, 3 from prairie dog towns, and 1 from cropland (14 total from dams in cropland).

Swift fox tracks and/or sign was found in 17 quarter sections in Study Area 1: 9 adults (35-39mm), 7 juveniles (32-36mm), one den site (Fig. 1). Three of the quarter sections with swift

fox tracks contained 2 sets of tracks (duplicate sets of tracks were not included in analyses). Sixteen (94%) of the swift fox tracks/sign occurred in quarter sections with no red fox tracks. Eight (47%) quarter sections with swift fox sign also contained coyote sign. Twelve (10%) of 122 quarter sections with coyote sign also contained red fox sign. The swift/red fox overlap track was a single 40-mm print in soft mud; other canid tracks at this location were coyote. No swift fox sign in Survey Area 1 was closer than 3.2 km to a prairie dog town. Seven swift fox tracks found at stock dams were oriented perpendicular to shore (only at one dam did they parallel the shore). Other canid tracks (e.g., coyote) also were found along the water and were oriented both parallel and perpendicular to the shore. Of the 7 swift fox tracks along creeks, 6 were oriented perpendicular to the creek border; only one traveled a short distance parallel to the border. Two swift fox tracks were found on cowpaths. The most interesting set of tracks came down to a shallow pool in North Black Banks Creek, which contained many large bullheads (*Ameiurus* spp.). This was the smallest set of tracks (32 - 34mm) found. Cover type of all quarter sections with swift fox tracks was native rangeland. Most swift fox tracks (81%) were found in quarter sections with short to mid-height grasses. In addition, most tracks (69%) were found in areas with low to moderate slopes.

Survey Area 2

Survey Area 2 was not searched as intensively as Survey Area 1; a total of 33 selected quarter sections were searched (Table 1). Three locations yielded no sign. Of the 30 quarter sections with furbearer evidence, 83 individuals were recorded including 28 coyotes, 12 raccoons, 15 muskrats, 7 skunks, 3 jackrabbits, 3 red foxes, 2 cottontail rabbits, 1 badger, 1 potential swift fox, and 11 dogs.

There were fewer suitable substrates in Survey Area 2, especially along creeks, which were often overgrown with tall vegetation. As well, many of the dams in this area were apparently visited by duck hunters and held tracks of dogs. Sections without dams, or that seemed to have mostly moderate to high residual cover or steep slopes were not searched. There was a higher percentage of locations with coyote tracks in Study Area 2 (85 vs. 32%) and fewer skunk (18 vs. 35%) than in Survey Area 1 (Table 1). Much search time was spent in prairie dog towns, but no swift fox sign was noted, except for the one set of possible prints at the stock dam within a large prairie dog town. The potential swift fox prints measured 38 and 40 mm in length. These were the only canid tracks of this size found in the area. Cover type was native rangeland. The residual cover in the quarter section with potential swift fox sign was low and topography was low to moderate, which was similar to quarter sections containing swift fox sign in Survey Area 1.

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Table 1. Species sign (tracks, feces, dens) observed in surveys of quarter sections in two survey areas in Fall River County, South Dakota.

	Survey Area 1		Survey Area 2	
Species	Quarter Sections[1]	Percent	Quarter Sections	Percent
Skunk (*Mephitis mephitis*)	138	34.8	6	18.2
Coyote (*Canis latrans*)	126	31.7	28	84.8
Raccoon (*Procyon lotor*)	99	24.9	12	36.4
Muskrat (*Ondatra zibethicus*)	52	13.1	15	45.4
White-tailed Jackrabbit (*Lepus townsendii*)	35	8.8	3	9.1
Badger (*Taxidea taxus*)	26	6.5	1	3.0
Red fox (*Vulpes vulpes*)	19	4.8	3	9.1
Swift fox (*Vulpes velox*)	17	4.3	0	0.0
Rabbit (*Sylvilagus* spp.)	8	2.0	2	6.1
Mink (*Mustela vison*)	4	1.0	0	0.0
Dog (*Canis familiaris*)	2	0.5	11	33.3
Swift fox/red fox overlap	1	0.3	1	3.0
No sign/unknown	174	43.8	3	9.1

[1]Number of quarter sections surveyed was 397 and 33 for Survey Areas 1 and 2, respectively.